F. F. DORSEY.

AUTOMATIC SOLE MACHINE.

APPLICATION FILED MAY 28, 1906.

1,044,443.

Patented Nov. 12, 1912.

7 SHEETS—SHEET 1.

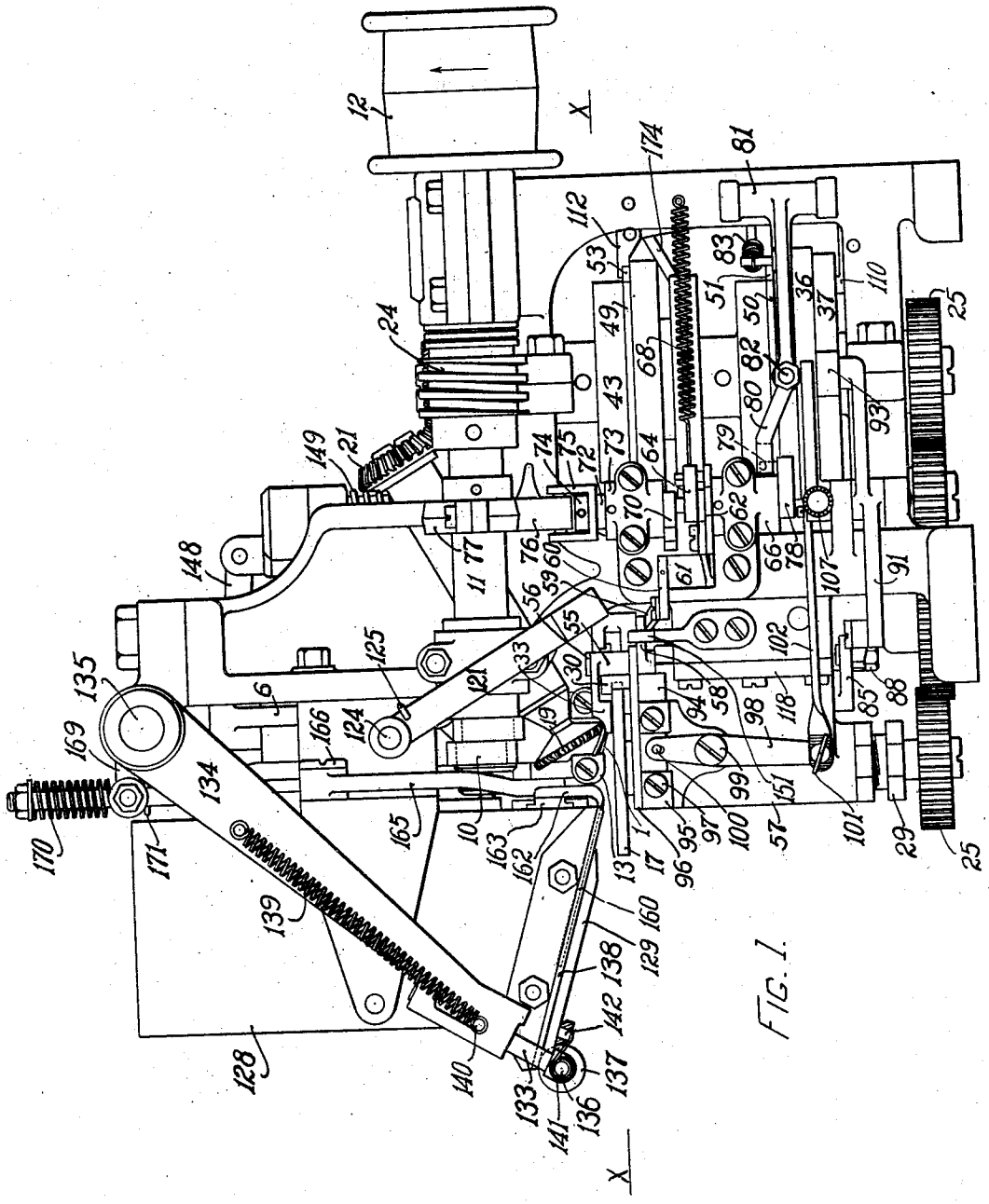

FIG. 1.

WITNESSES

E. C. Underwood

Alfred H. Hildreth

INVENTOR

Furnum F. Dorsey

by his Attorneys

Phillips Van Everen & Fisk

F. F. DORSEY.

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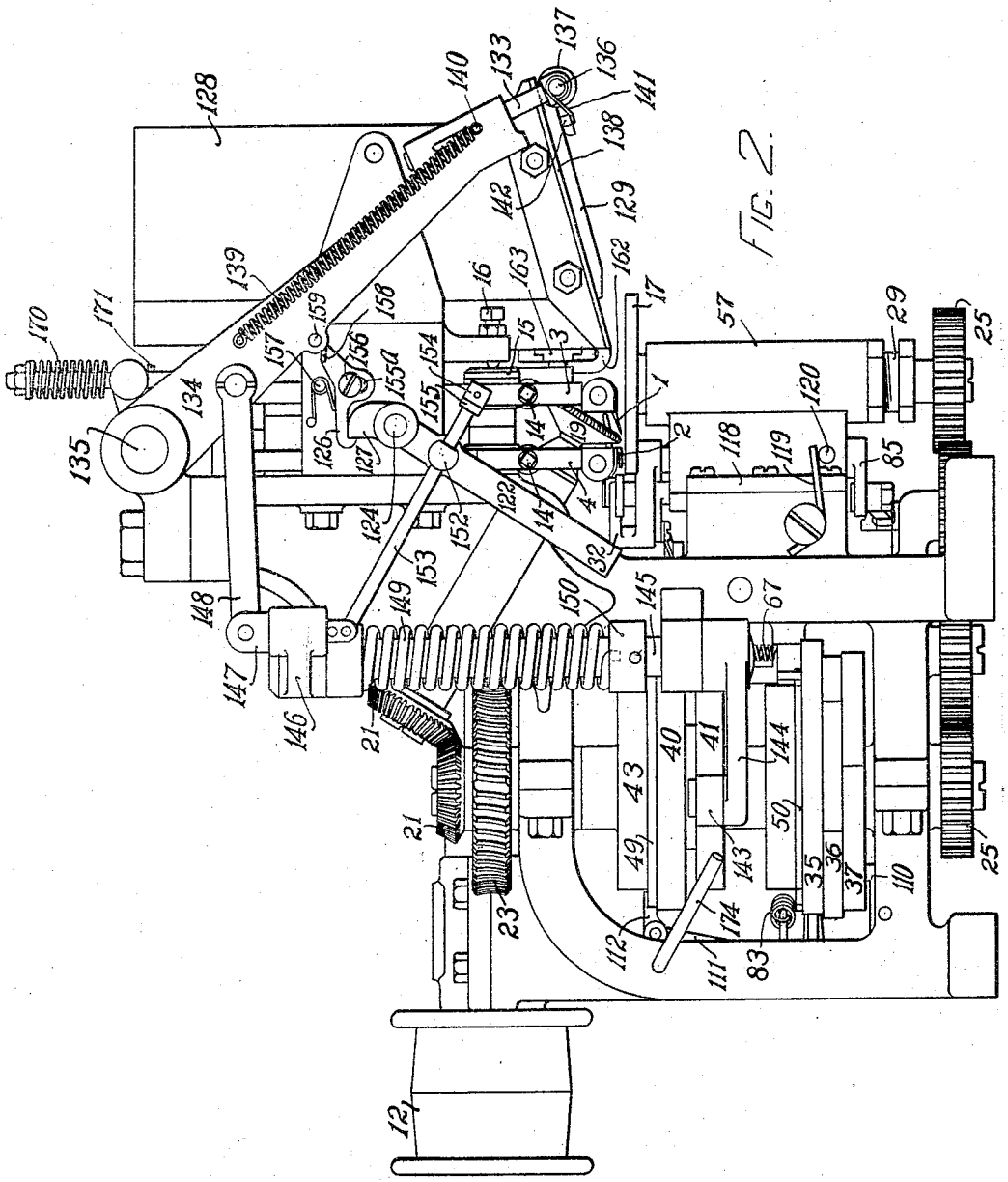

FIG. 2.

WITNESSES

E. C. Sundeman

Alfred H. Hildreth

INVENTOR

Farnum F. Dorsey

by his Attorneys

Phillips Van Orsdel & Fish

F. F. DORSEY.

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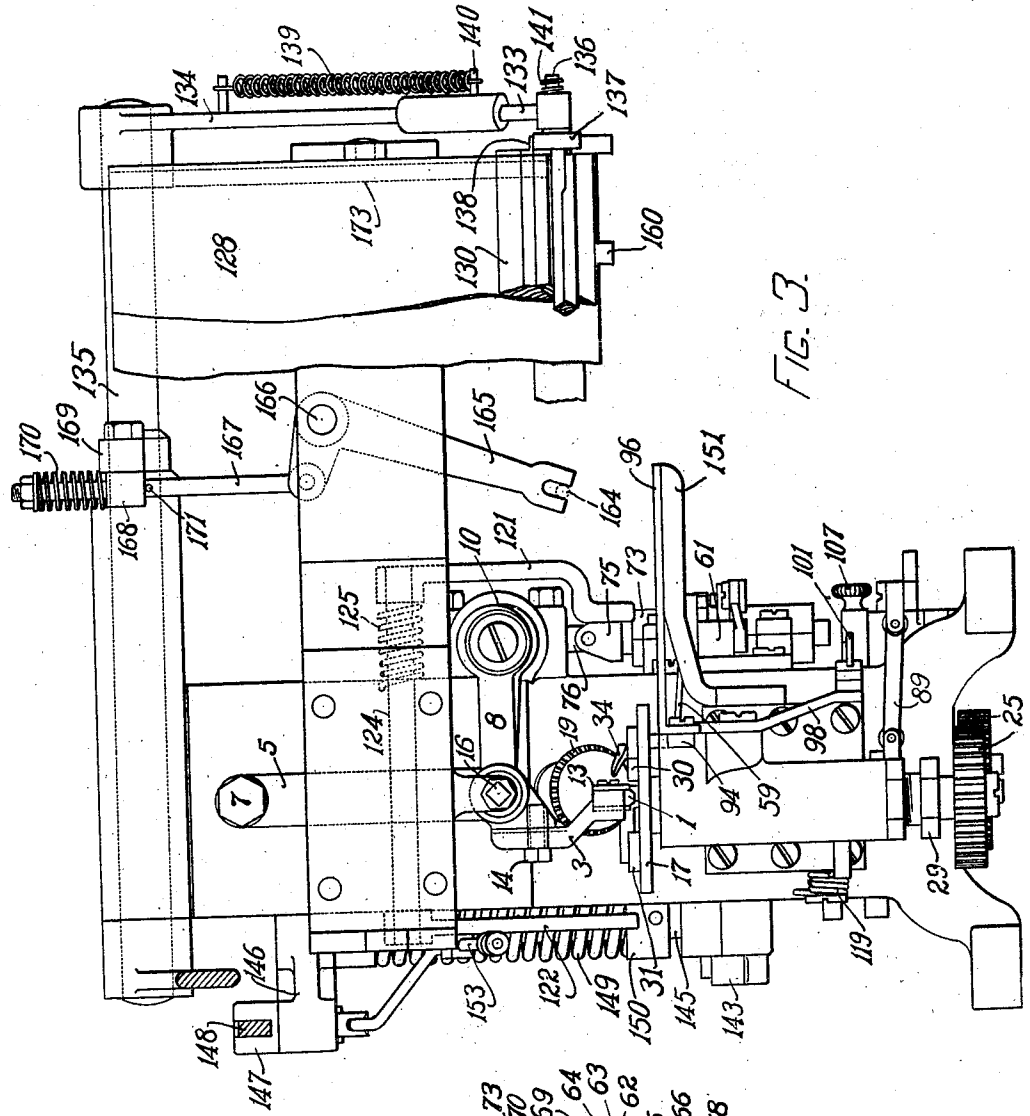

FIG. 3.

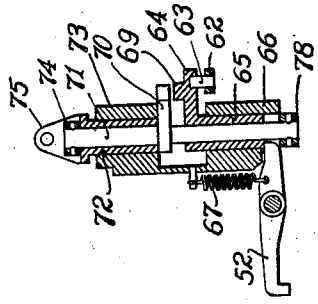

FIG. 7.

WITNESSES

E. C. Sundeman

Alfred H. Hildreth

INVENTOR

Farnum F. Dorsey

by his Attorneys

Phillips Van Emmen & Fish

F. F. DORSEY.

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7 SHEETS—SHEET 4.

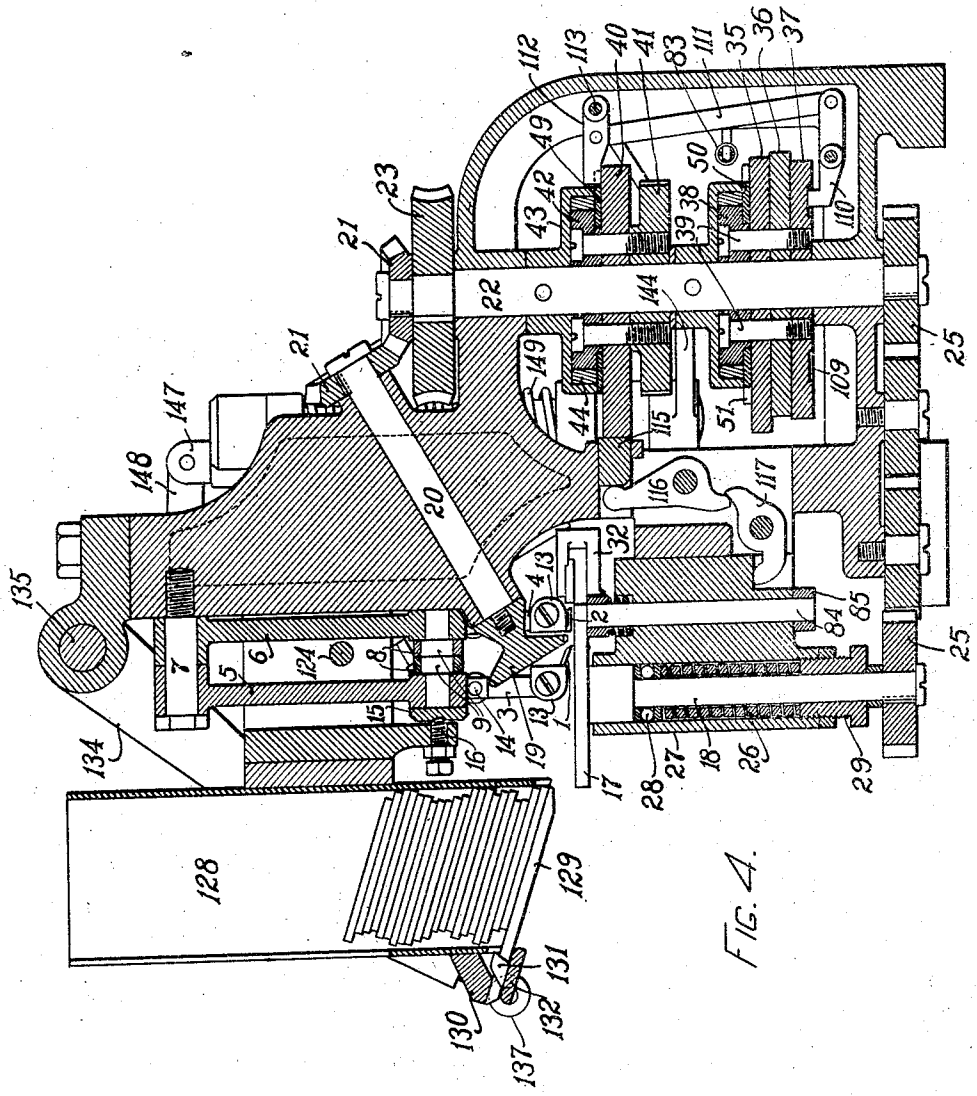

FIG. 4.

WITNESSES

E. C. Wiedeman

Alfred H. Hildreth

INVENTOR

Farnum F. Dorsey

by his Attorneys

Phillips Van Everen & Fish

F. F. DORSEY.

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7 SHEETS—SHEET 5.

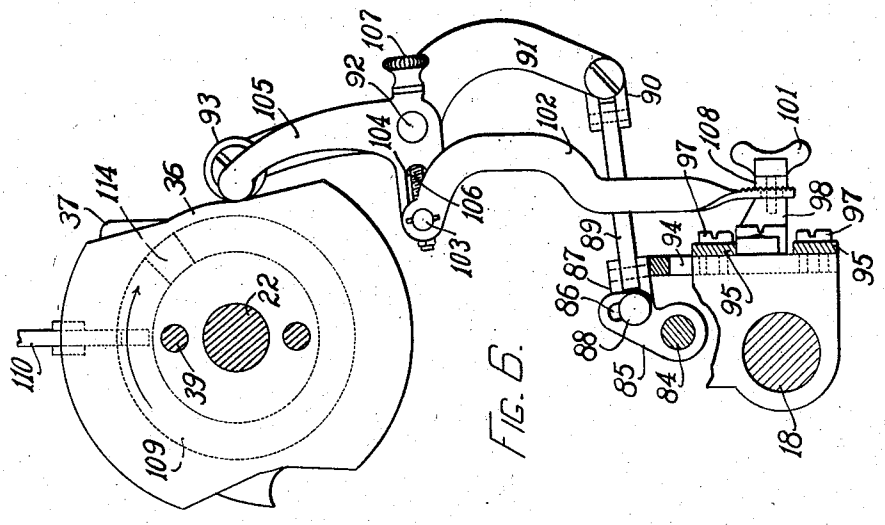

FIG. 6.

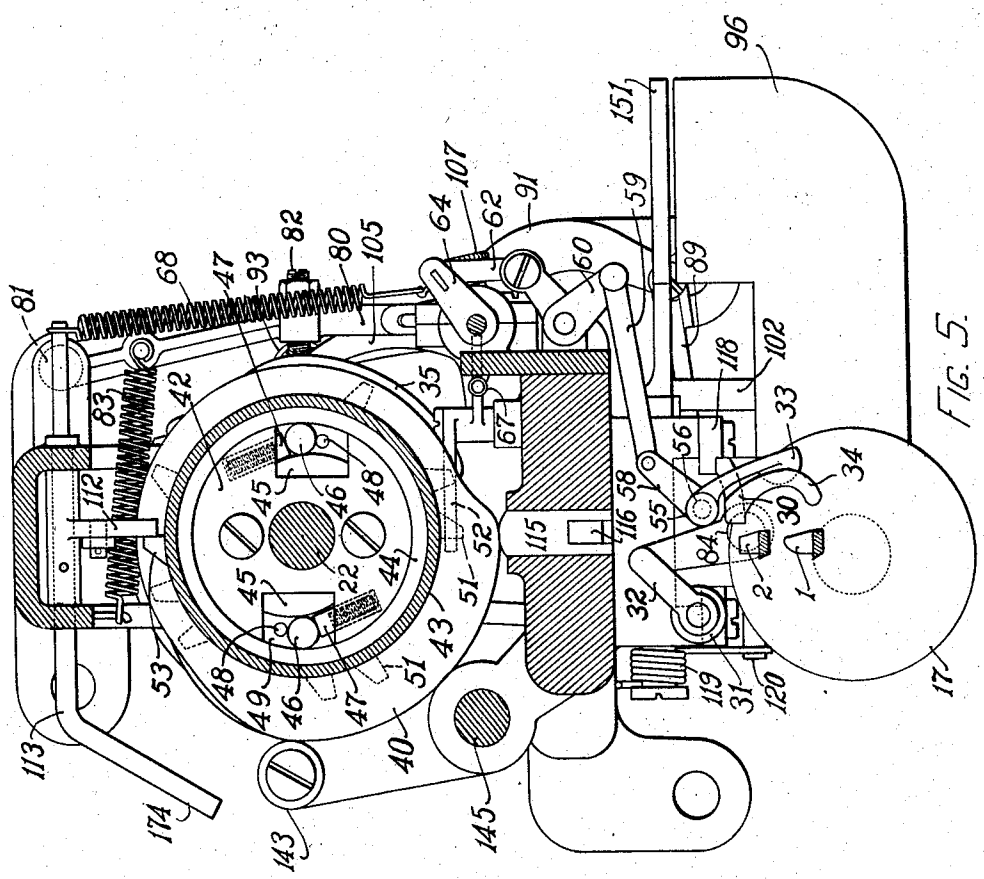

FIG. 5.

WITNESSES

E. C. Wiedeman

Alfred H. Hildreth

INVENTOR

Farnum F. Dorsey

by his Attorneys

Phillips Van Everen & Fish

F. F. DORSEY.

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7 SHEETS-SHEET 6.

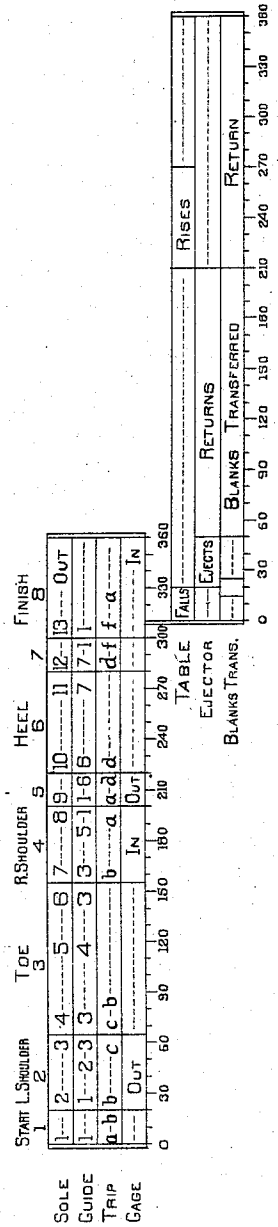

FIG. 8.

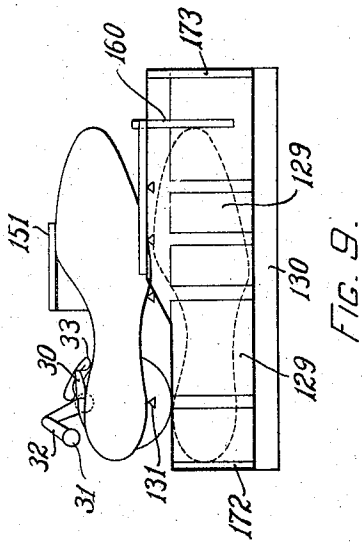

FIG. 9.

WITNESSES

E. C. Wurdeman

Alfred H. Hildreth

INVENTOR

Fairman F. Dorsey

by his Attorneys

Phillips Van Etten & Fish

F. F. DORSEY.

AUTOMATIC SOLE MACHINE.

APPLICATION FILED MAY 28, 1906.

1,044,443. **Patented Nov. 12, 1912.**

7 SHEETS—SHEET 7.

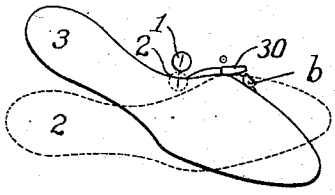

FIG. 10.

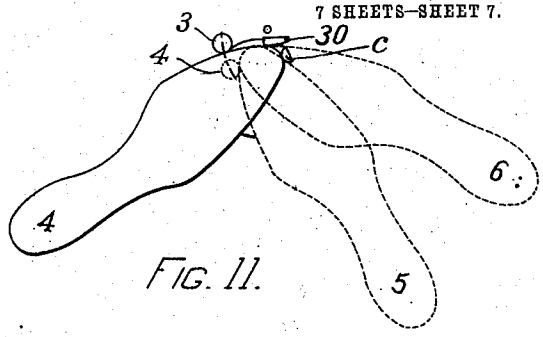

FIG. 11.

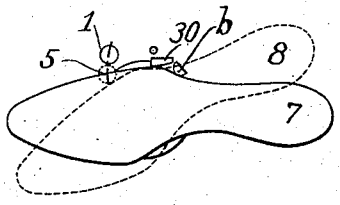

FIG. 12.

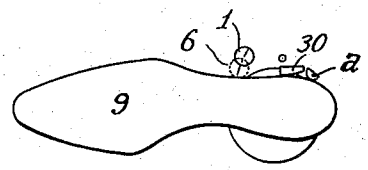

FIG. 13.

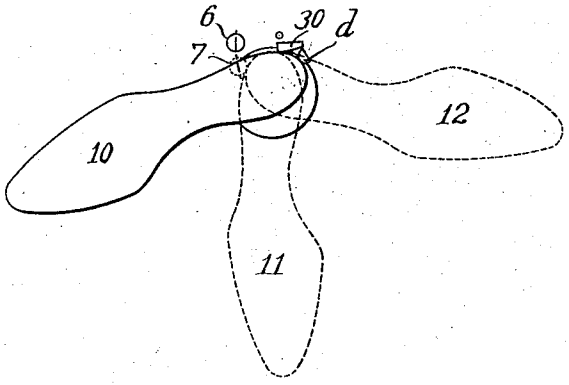

FIG. 14.

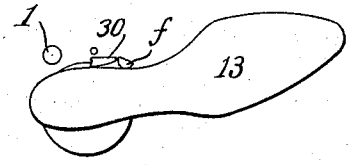

FIG. 15.

WITNESSES

E. C. Wurdeman

Alfred N. Hildreth

INVENTOR

Farnum F. Dorsey

by his Attorneys

Phillips Moen Evans & Fish

UNITED STATES PATENT OFFICE.

FARNUM F. DORSEY, OF WINCHESTER, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

AUTOMATIC SOLE-MACHINE.

1,044,443. Specification of Letters Patent. Patented Nov. 12, 1912.

Application filed May 28, 1906. Serial No. 319,057.

To all whom it may concern:

Be it known that I, FARNUM F. DORSEY, a citizen of the United States, residing at Winchester, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Sole-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in automatic sole machines.

In the manufacture of soles and insoles for use in boots and shoes it is necessary to prepare the sole blank, which is usually made of leather, for the reception of the stitches by which it is secured in the shoe, by channeling, shouldering or otherwise operating upon its marginal portion. These operations are usually performed by machines similar in their general mode of operation, having instrumentalities engaging the marginal portion of a sole blank and comprising means for holding and feeding the blank and knives or other appropriate means for operating on the margin of the blank.

The chief object of the present invention is to produce a machine of the character above described in which the operation is wholly automatic, the attention of an operator being necessary only in maintaining a supply of blanks in the hopper of the machine. The invention in this respect is an improvement on the machine described in the application of E. E. Winkley, filed April 2, 1906, Serial No. 591,796, for Letters Patent of the United States, on improvements in automatic sole machines, to which reference is herein made by permission, since it comprises not only automatic mechanism for swinging the blank during the operation thereon, but also automatic means for controlling other functions of the machine, including the adjusting movements of the edge gage and the replacement of a finished sole or insole with a fresh blank.

Another object of the invention is to effect improvements in the arrangement and construction of the knives and their actuating mechanism by which their operation is facilitated, and the use of a large feed wheel and heavy pressure of the feed wheel against the work is obviated together with the injury to the sole resulting therefrom.

The invention consists in the improved automatic sole machine hereinafter described, as defined in the claims.

In the drawings, Figure 1 is a right-hand side elevation of a machine embodying the present invention, and Fig. 2 is a left-hand side elevation of the same; Fig. 3 is a front elevation with portions of the hopper and blank-supplying mechanism broken away; Fig. 4 is a vertical section on planes passing through the cam shaft and the axis of the work support; Fig. 5 is a horizontal section taken substantially on the line *x*—*x*, Fig. 1; and Fig. 6 is a plan view of the cams and a portion of the mechanism actuated thereby for operating the edge gage and the movable guide; Fig. 7 is a detail view in vertical section of a portion of the trigger mechanism; Fig. 8 is a diagram of the cycle of operations of the machine; and Figs. 9 to 15 inclusive are diagrams showing the movements of the blank under the influence of the automatic transferring and guiding devices and the positions assumed by the guide and feeler.

The invention is illustrated as embodied in a machine for making soles, the machine having knives for channeling the sole blanks and for shouldering the edge thereof, as is customary in the manufacture of soles for turn shoes. In addition to the channeling and shouldering knives, which are hereinafter referred to in general as the "operating means", the machine is provided with means for supporting and feeding the blanks, means for automatically guiding and swinging the blanks as the operation proceeds about the margin thereof, and automatic means, acting when the operation upon a blank is completed, to discharge the blank and substitute a fresh blank, so that the operation of the machine is continuous without the intervention of an operative.

The channeling knife 1 and the shouldering knife 2 are mounted in carriers 3 and 4 fixed to vertical arms 5 and 6 which are pivoted at their upper ends, as shown particularly in Figs. 3 and 4, upon a stud 7 on the frame of the machine. This pivotal arrangement of the arms permits their lower ends to be reciprocated slightly so as to cause the knives to vibrate in a substantially

horizontal direction in order to facilitate their cutting operation and cause them to have a chopping action in the line of feed instead of a drag cut. The arms 5 and 6 are reciprocated by means of links 8, pivoted on studs 9 fixed to the arms (see Figs. 3 and 4), and embracing at their other ends eccentrics 10 (see Fig. 1) on the forward end of the drive shaft 11 of the machine. The drive shaft is rotated rapidly by a pulley 12 connected with any suitable source of power, and since the eccentrics 10 are oppositely disposed upon the shaft, as shown in Fig. 1, they cause the two knives to vibrate constantly and rapidly in opposite directions through short distances in the line of feed of the sole blank. Owing to this arrangement only one knife at a time is acting upon the blank, and owing to this fact and to the chopping action of the knives, the drag upon the work due to the knives is greatly reduced, so that resistance to the feed is much less than in machines in which two knives operating simultaneously and with a drag cut are used, and this feature of the invention renders possible the use of a feed wheel of small diameter resting with comparatively slight pressure against the work and offering little resistance to the swinging of the blank in accordance with its curvature.

The shanks of the knives 1 and 2 are secured adjustably in carriers 3 and 4 by clamp plates 13 screwed to the carriers, and the lower edges of the clamp plates operate as pressers to limit the depth to which the knives cut into the work. The carriers 3 and 4 have a tongue-and-groove engagement with the arms 5 and 6, as shown in dotted lines, Fig. 3, and are fixed to the arms by screws 14. This arrangement permits the ready removal of the carriers for the purpose of sharpening the knives, and their replacement without change in the adjustment of the knives. As shown in Fig. 4, the rear side of the arm 6 bears against a surface on the frame of the machine, the studs 9 bear against each other at their ends, and the outer surface of the arm 5 is engaged by a bearing plate 15 supported by a set screw 16, and thus the arms 5 and 6 and the knives are supported against lateral thrusts and the knives are maintained in proper relative position during their vibration.

The sole blank is supported upon a circular flat work support 17, which is mounted upon the upper end of a shaft 18 by which it is rotated to assist in feeding the work. The upper surface of the work is engaged by the feed wheel 19, which is inclined for a purpose hereinafter set forth and is provided with teeth upon its periphery. The wheel engages the sole blank near the edge thereof, and between the points of operation of the channeling knife and the shouldering knife, as shown particularly in Fig. 1. The feed wheel is mounted upon and actuated by an inclined shaft 20 journaled in the frame of the machine and connected by bevel gears 21 with the vertical cam shaft 22. The cam shaft carries a worm gear 23 which is driven by a worm 24, Fig. 1, on the drive shaft 11, the lower end of the cam shaft 22 being connected by a train of gears 25 with the lower end of the work support shaft 18, as shown in Fig. 4. The arrangement above described is such that as the drive shaft 11 is constantly rotated in the direction of the arrow, Fig. 1, the cam shaft 22, the feed wheel shaft 20, and the work support shaft 18 are constantly rotated at a greatly reduced speed, and the feed wheel and the work support tend to feed the work from right to left, while the constantly vibrating knives operate to channel and shoulder the margin of the sole as it is fed past them by the feeding means.

The work support, while in engagement with a sole, is pressed thereagainst by a spring 26 surrounding the shaft 18 and located in the work support carrier 27. The spring 26 acts through a ball-thrust bearing 28 to reduce the friction, and the lower end of the spring bears against an adjusting screw 29 which forms a bearing for the shaft 18.

The distances of the cuts produced by the knives from the edge of the sole are determined by an edge gage 30 which projects slightly over the upper surface of the table, as shown in Fig. 5, slightly in advance of the point of operation of the knives. The front of the edge gage is rounded off as shown in Fig. 5, to enable the work to swing properly during the operation upon the concave shank portion thereof. During the greater part of the operation upon the sole blank the edge gage is fixed in position, but at certain points in the operation it is automatically moved toward and from the knives, as will be presently described.

In order to cause the sole blank to be properly swung at its points of greatest curvature, particularly at the angles between the shank and the forepart, and at the ends of the blank, a movable guide 31 is used, in the form of a roll which engages the edge of the blank a short distance to the left of the point of engagement of the knives, this roll being carried by an arm 32 which is crooked, as shown in Figs. 4 and 5, to enable it to swing the guide over the upper surface of the work support. This guide is actuated automatically during the operation upon the sole blank by means hereinafter described.

The various automatic functions of the machine are caused to occur at the proper times by means of a feeler 33, having a semi-

circular extremity which bears lightly against the edge of the blank slightly in advance of the point of operation of the knives. This feeler is held lightly against the blank by a spring, and in accordance with the various positions assumed by it as the blank is fed and the contour thereof in contact with the feeler varies the feeler, through connections with the actuating mechanisms for the various automatic devices, causes them to operate at the proper times.

A curved finger 34, fixed to the top of the edge gage and extending over the work close to the knives, operates, as will be hereinafter explained, as a clearer to free the work from the knives when the operation thereof is completed.

The mechanisms by which the several automatic devices of the machine are operated are all actuated by cams mounted upon the constantly rotating cam shaft 22, these cams being normally disconnected from the cam shaft and remaining idle until they are temporarily connected rotatively with the shaft at certain times in the operation of the machine by clutches thrown into and out of operation by the feeler 33. The cams 35, 36 and 37 (see Figs. 4 and 6) by which the operations of the feeler mechanism, the edge gage and the movable guide, respectively, are controlled, are secured together and connected with the driven member 38 of the lower clutch by means of screws 39, and the cams 40 and 41 by which the work support and clearer and the blank-supplying mechanisms respectively are actuated, are similarly connected with the driven member 42 of the upper clutch. As shown in Figs. 4 and 5, the upper clutch comprises a member 42 having a generally circular form, and embraced by the driving member 43 of the clutch, which is pinned to the cam shaft 22, as shown in Fig. 4, and has a depending flange in which is fixed a hardened steel ring 44 closely but loosely embracing the driven member 42 of the clutch to which the cams are secured. The member 42 is provided with diametrically opposite recesses in which are seated hardened blocks 45 having curved outer surfaces slightly eccentric to the inner surface of the driving ring 44. Hardened rolls 46 are located between the driving ring and the blocks 45, and spring plungers 47 tend normally to press the rolls into the tapering spaces between the ring and the blocks so that as the driving ring rotates, the rolls, when acting freely under the influence of the spring plungers, tend to pinch between the clutch members and cause the member 42 to be rotated by the driving member 43 and to rotate the cams with the cam shaft. This operation is normally prevented, however, by means of two pins 48 which are fixed in and project upwardly from a trip ring 49 (see Fig. 4) which is journaled upon a shoulder of the clutch member 42 below the lower surface of the clutch member 43, and is free to turn relatively to the clutch member 42 through a limited space. The pins 48 engage the rolls 46 opposite to the spring plungers 47, and it will be apparent that if the rotation of the ring 49 be arrested, the pins will arrest the revolution of the rolls 46 with the driving member of the clutch, the spring plungers yielding sufficiently for this purpose, and thereby the driven member 42 and the cams connected therewith will be brought to rest and held as long as the ring 49 is prevented from rotating. As soon as the ring is released again the spring plungers force the rolls 46 again into operative position, the pins 48 yielding freely to permit this to occur, and the rotation of the clutch member 42 and the cams is immediately resumed, the ring 49 rotating idly with the clutch member 42. The construction of the lower clutch is similar to that of the upper clutch, and the ring 50, corresponding in operation to the ring 49, is provided with a series of stops 51, shown in dotted lines in Fig. 5, arranged at uneven distances about its periphery. The stops are engaged by a detent 52 (see Figs. 5 and 7) which is intermittently tripped by mechanism controlled by the feeler 33 so that at intervals during the operation of the machine the lower clutch is thrown into operation and permitted to rotate the lower set of cams through a distance equal to the space between two successive stops on the ring 50, the cams coming to rest again as soon as the next successive stop engages the detent, and thus the cams 35, 36 and 37 are caused to make a number of partial rotations amounting, at each complete cycle of operations of the machine, to a complete rotation of these cams, the lengths of the several movements being proportioned to the length of time to be consumed in the several operations caused by these cams. The stop ring 49 of the upper clutch is provided with a single stop 53, so that the cams 40 and 41 make a complete rotation each time they are thrown into operation, which occurs once in each cycle of operation of the machine.

The mechanism by which the feeler 33 throws the clutches and the cams intermittently into operation will now be more particularly described.

The feeler 33 is fixed to a sleeve 55 journaled upon a stud 56 on the bracket 57 in which the work table shaft 18 is journaled, and the sleeve 55 is provided with an arm (see Figs. 1 and 5) connected by means of a link 59 with one arm of a bell-crank lever 60 which is pivotally mounted on a bracket 61 on the frame of the machine. The other arm of the bell crank lever carries a pivoted

link 62 loosely engaged, as shown in Figs. 1 and 7, by a pin 63 fixed in an arm 64, hereinafter referred to as a "trigger arm." The trigger arm is fixed to the upper end of a sleeve 65 which is free to rotate or to slide vertically in a fixed sleeve 66 mounted in the frame of the machine. The lower end of the trigger sleeve 65 rests upon one end of the detent 52 above described, (see Figs. 5 and 7) the sleeve being normally held in raised position by a spring 67 connected with the detent, the spring acting also to maintain the detent normally in position to engage the clutch stops 51 as above described. A spring 68, connected at its forward end as shown in Figs. 1 and 5, with the trigger arm 64, tends to swing the parts to the position of Fig. 5, in which the feeler is in its most advanced position, but when a blank is in the machine the feeler is pushed back by the edge of the blank and operates, through the mechanism above described, to swing the trigger arm 64 against the resistance of the spring 68 to a more forward position, and as the feeler moves in or out in consequence of the varying contour of the sole blank, the trigger arm is swung to different positions about the axis of the sleeve 65. The trigger arm 64 carries a narrow upward projection 69, which is engaged, when the trigger arm has been swung to the pre-determined position in the manner above described, by a trip which constantly reciprocates vertically during the operation of the machine, and thus the trigger arm and sleeve are depressed and the detent 52 is disengaged from the stop 51 with which it is in contact at the proper moment.

The trip consists of a horizontal arm 70 located above the trigger arm 64 and fixed to a shaft 71 which has a bearing in the sleeve 65 and is free to turn and to reciprocate vertically therein, so that the extremity of the trip arm swings about the same center as the trigger arm. The upper portion of the shaft 71 is journaled in a sleeve 72, which, in turn, is journaled in a sleeve 73 on the frame of the machine. The shaft 71 is confined against longitudinal movement in the sleeve 72 by a collar 74, and the upper end of the sleeve is provided with lugs 75 by which it is pivotally connected, as shown in Figs. 1 and 3, with a link 76 integral with an eccentric strap 77. The eccentric strap embraces an eccentric on the drive shaft 11, and thus, as the shaft rotates rapidly, a rapid vertical reciprocation of slight amplitude is imparted to the sleeve 72 and the shaft 71 and trip arm 70. So long as the trigger arm is not directly beneath the trip arm this reciprocation is without effect, but as soon as the trigger arm has been swung to a position directly beneath the trip arm the projection 69 is engaged by the trip arm at its next succeeding downward movement, and the trigger arm is thereby depressed and the clutch thrown into operation as above described.

Although, by the mechanism above described, the trip 52 is released at the proper moment positively and with certainty, by means of power derived from the drive shaft of the machine, no resistance is imposed upon the free movement of the feeler in response to the movement of the sole blank, except the very slight pressure against the sole due to the spring 68, since the feeler does not directly operate upon the trip to release it, but has only to swing the trigger arm back and forth against no substantial resistance, and for this reason the feeler does not interfere in any way with the free movement of the blank in response to the mechanisms operating thereon. Since the feeler operates to throw the clutch and the cams into operation upon encountering several different portions of the sole blank having different forms, it will be apparent that the feeler must have such operation upon attaining several different pre-determined positions, according to the portion of the blank with which it is in engagement, and for this reason the trip arm 70 does not reciprocate always in the same position, but is automatically adjusted from time to time during the operation of the machine to different positions about the axis of its shaft 71 so as to engage the trigger upon the attainment of different positions by the feeler. To this end the lower end of the shaft 71 is provided with an arm 78 carrying an upwardly-extending pin 79 engaged by the forked end of a cam lever 80, which is pivoted at 81 upon the frame of the machine and has an adjusting screw 82 bearing against the cam 35. A spring 83, connected with the cam lever 80 and the frame of the machine, as shown particularly in Fig. 5, maintains the screw 82 in contact with the cam. At each of the intermittent movements of the cams the cam 35, operating through the means above described, swings the arm 78 and the trip arm 70 to the proper position to determine the point at which the feeler shall next throw the clutch and the cams into operation, and by varying the form of the cam 35 or by changing the adjustment of the screw 82, the feeler mechanism can be adapted to control the automatic functions of the machine for a sole blank of any form.

The engagement of the blank by the feeler at a substantial distance in advance of the point of operation thereon is a feature of great importance, since it enables the feeler to anticipate the necessary movements of the automatic guiding mechanism, that is, the feeler acts to throw the mechanism into operation before the blank has moved, owing to a sharp change in contour, out of proper relation to the knives, so that the blank may

be swung at the precise moment when this is necessary and not shortly after such movement becomes necessary. This arrangement also affords sufficient time in which to set the mechanism into operation without the necessity of sudden movement and the jar incident thereto.

The mechanism for operating the movable guide 31 is constructed as follows:—The guide arm 32 is fixed to the upper end of a shaft 84 (see Figs. 4, 5 and 6) which is journaled in the work-support bracket 57 and carries at its lower end an arm 85. The arm 85 is slotted at 86 to receive a swivel block 87 adjustably connected with the arm by a stud 88. A link 89 is pivoted to the block 87 at one end, and at its other end it is connected by means of a swivel block 90 with a cam lever 91 pivoted at 92 upon the frame of the machine and carrying at its rear end a cam roll 93 which engages the cam 37.

By the mechanism above described the guide 31 is swung forward or released by the intermittent movements of the cam 37 so as to properly guide the sole blank in the manner hereinafter described.

Since it is desirable to change the position of the edge gage 30 during the operation upon the sole blank so as to vary the distance of the channel and shoulder from the edge of the sole for different parts thereof, mechanism is used to automatically move the edge gage. The edge gage is mounted on an upward extension from a slide 94 (see Figs. 1 and 6) which slides horizontally on the work support bracket 57, being held in a slot therein by means of the lugs 95 upon which the table 96, hereinafter described, is mounted. Screws 97, by which the table is secured in place, pass through slots in the slide 94 and into a bracket 57. This arrangement is such that the slide 94 has a limited longitudinal motion so as to advance or retract the edge gage, and the slide 94 is moved by means of a lever 98 pivoted at 99 upon the bracket 57 and engaging at its upper end a pin 100 on the slide 94. The lower end of the lever 98 is adjustably connected by a thumb screw 101 with a link 102, which is pivotally connected at its other end with a nut 103 which slides in a slot 104 in one arm of a bell crank lever 105, pivoted at 92, as shown in Fig. 6, and engaging at its rear end the cam 36. The nut 103 is in threaded engagement with an adjusting screw 106 journaled in the cam lever 105, and provided with a head 107 by which it may be turned. By this arrangement the distance of the nut from the pivot 92 may be varied so as to vary the amplitude of the movements imparted to the link 102, and thence to the edge gage. The thumb screw 101 carries a toothed washer 108 loosely pivoted thereon and engaging corresponding teeth on the end of the link 102, as shown in Fig. 6. By loosening the thumb screw the link, which is slotted for this purpose, may be moved relatively to the nut 108 and the thumb screw so as to vary the position of the edge gage, irrespective of the position of the cam lever 105. This arrangement provides for determining the initial position of the edge gage, and since the screw 106, above described, provides for varying the amplitude of movement imparted to the edge gage, these two adjustments in combination permit the adjustment of the machine for any widths of margin desired for both the shank portion and the forepart portion of the sole, the cam 36 being patterned to move the edge gage at the times when the operation upon the blank is proceeding from the shank to the forepart and vice versa.

The automatic operations by which the completed blank is discharged and a fresh one substituted comprise the operation of lowering the work support and the clearer 34 to free the work from the knives and from the feed wheel, the ejecting of the blank from the machine by a horizontal movement, the feeding of a fresh blank into position upon the work support, and the raising of the work support to bring the blank into operative engagement with the knives and the feed wheel. The mechanisms for performing these operations are set into motion at the proper time by the following mechanism: Upon the bottom of the guide cam 37 is formed a cam surface 109 (Fig. 4, and dotted lines in Fig. 6) which is engaged by a cam lever 110 pivoted to the frame of the machine and connected at its rear end by means of a link 111 with a detent 112 (Figs. 4 and 5) pivoted upon a rock shaft 113 journaled in the frame of the machine. The detent 112 normally engages and holds the single stop 53 on the stop ring 49 of the upper clutch, but the cam surface 109 has a projection 114 which is so located that after the operation upon the sole blank has been completed and the sole blank has returned to its original position, the last movement imparted to the lower cams by the feeler mechanism causes the projection 114 to engage the cam lever 110 so that the detent 112 is tripped and the upper clutch is thrown into operation, causing a complete rotation of the cams 40 and 41. The cam 40, which operates to lower and raise the work support, engages a slide 115 having a bearing in the frame of the machine. The slide 115 is connected, by bell-crank levers 116 and 117 journaled in a vertical slot in the frame of the machine, with the work support bracket 57, which is mounted to slide vertically, as shown in Figs. 1, 4 and 5, in a way on the frame of the machine, the bracket being retained in the way by plates 118 screwed to the frame. During the oper-

ation upon a blank the parts above described have the position shown in the drawings, the work-support bracket 57 being held in raised position, but upon the first motion of the cam 40 the slide 115 is released and the work-support bracket and the work support, together with the parts mounted thereon, fall. Since the clearer 34 is connected with the work-support bracket it falls therewith and draws the blank down clear from the knives and the feed wheel. In order to insure this operation a spring 119 is provided, (see Figs. 2 and 5), this spring engaging a pin 120 on the work-support bracket, and operating to pull the bracket down as soon as it is released. During the continued rotation of the cam 40 the work support remains down until a fresh blank has been placed upon it, and then rises again under the influence of the cam 40.

The finished sole is ejected after the work support has dropped by two arms or ejectors 121 and 122 (Figs. 1, 2 and 3) fixed to the ends of a rock shaft 124 journaled in the frame of the machine, one or the other of the ejectors operating according to the position occupied by the sole at the completion of the operation thereon, such position differing according as the blank has been channeled completely about its periphery, as is common in some classes of work, or only about the shank and forepart, as in work of other kinds. A spring 125, shown in dotted lines in Fig. 3, tends to swing the ejectors forward, but the ejectors are normally held in retracted position by means of a detent 126 (Fig. 2) which engages a lug 127 on the ejector 122. The detent 126 is released at the proper time, and the ejectors are raised after their operation, by mechanism which will be described in connection with the description of the blank-supplying mechanism by which it is actuated.

The supply of blanks is contained in a hopper 128 mounted on the front of the machine. The hopper, as shown in Fig. 9, is wider at its right-hand portion than at its left-hand portion, so as to approximate the dimensions of the largest blanks which are placed therein. The blanks are fed from the bottom of the hopper and the hopper is located slightly above the work support so that the blank which is being operated upon may swing freely under the bottom of the hopper. Owing to this arrangement the hopper may be placed very close to the operating instrumentalities, so that it is necessary in transferring a blank from the hopper to the work support to move the blank only a short distance laterally, as will be clearly apparent from Fig. 9, in which the original position of the blank is shown in dotted lines, instead of moving the blank through a distance equal to or greater than its length, as would be necessary if the hopper were on the level with the work support but removed sufficiently from the operating means to afford clearance for the blank operated upon. The bottom of the hopper is inclined to facilitate the transfer of a blank therefrom to the work support, and it is formed of several separated portions 129, between which are slots for the passage of the fingers by which the blanks are moved laterally. The forward extremities of the base 129 are fixed to a bar 130 on the front of the hopper. The transfer fingers 131 (Fig. 4) are fixed to a flat bar 132 pivoted at its ends in plungers 133 (Figs. 1 and 2) which slide in the ends of rock arms 134 fixed to the ends of a rock shaft 135. The rock shaft 135 is journaled in a bracket on the frame of the machine. The trunnions 136 at the ends of the bar 132, by which it is pivoted, carry guide rolls 137 which engage guides 138 on the ends of the hopper, and springs 139 are connected with the rock arms 134 and with pins 140 fixed to the plungers 133 and moving in slots in the ends of the rock arms. This arrangement is such that the bar 132 is caused to move close to the bottom of the hopper, but friction between the bar and the hopper is prevented by the guide rolls 137. The rear edge of the bar 132 is normally held up by springs 141 engaging lugs 142 on the ends of the bar.

The rock shaft 135 and the rock arms are actuated at the proper time by mechanism connecting the rock shaft with the cam 41 connected with the upper clutch. The cam engages a cam roll 143 on a cam arm 144 fixed to a vertical rock shaft 145 journaled in the frame of the machine. The rock shaft carries at its upper end an arm 146 (Figs. 2 and 3) carrying a swivel stud 147. A link 148 is pivotally connected with the swivel stud and with one of the rock arms, as shown in Fig. 2. A coiled spring 149, surrounding the rock shaft 145, is fixed at its upper end to the frame of the machine, and at its lower end to a collar 150 pinned to the rock shaft, and this spring operates to maintain the cam roll 143 normally in contact with the cam 41, and to move the blank-transferring mechanism in one direction, while the mechanism is moved in the opposite direction against the resistance of the spring by the cam. The mechanism is so arranged that it is operated by the spring when performing its active movement, that is, in transferring a blank from the hopper to the work support, so that, in case the mechanism becomes clogged in any way, its action may be arrested without injury to the machine.

To facilitate the proper location of the sole blank with relation to the operating means by the blank-transferring devices, the machine is provided with a table, the part 96 before mentioned, which is secured by means

of the lugs 95 to the work-support bracket 57 a little below the level of the work support. An edge stop 151 is secured to the frame of the machine, and has a horizontal portion extending along the edge of the table 96, as shown in Figs. 1, 3 and 5. When the blank is transferred from the hopper to the work support by the devices above described, the table 96 is in lowered position, owing to the lowered position of the bracket 57, and the edge stop 151 therefore extends above the surface of the table. As shown in Fig. 9, the table supports the forepart of the blank, while the edge stop, coöperating with the edge gage 30, insures the presentation of the blank at the proper angle to the knives. When the rock arms 134 are actuated by the spring 149 as above described the transfer fingers 131 engage the edge of the blank, as shown diagrammatically in Fig. 9, and the blank is pushed out of the bottom of the hopper until it is clear from the hopper, the rear edge of the blank being supported upon the finger bar 132, while the forward edge slides under the clearer and into contact with the edge gage and edge stop. When the blank has reached this position the movement of the rock arms is arrested, the spring 149 ceasing to effect any further movement of the arms 134, and the continued movement of the cams 41 subsequently causes the arms to be moved back again. Shortly before this return movement of the arms, however, the work support rises so as to grip the blank and prevent it being drawn back out of engagement with the edge gage at the commencement of the return movement. During the return movement of the finger bar 132 the fingers 131 pass freely under the lowermost blank, owing to the pivoted arrangement of the bar, which permits the fingers to be depressed.

The mechanism by which the ejectors are set and released operates in conjunction with the blank-transferring mechanism. The ejector 122 is provided with a pivoted stud 152, through which passes loosely a link 153 pivotally connected with the lower end of the swivel stud 147. The link 153 carries a collar 154 and a buffer 155, as shown in Fig. 2. The detent 126 is slotted at 155ª and mounted upon a screw 156 on the frame of the machine. A spring 157 normally holds the detent in lowered position, but the detent is provided with a lateral lug 158 which is in position to be engaged by a pin 159 on the rock arm 134, as shown in Fig. 2. The first inward movement of the rock arm, therefore, causes the pin 159 to engage and trip the detent, whereby the ejectors are released and swung forward by the spring 125, as above described, the movement of the ejectors being arrested by the buffer 155. During the continued blank-transferring movement of the rock arms the link 153 draws the ejector 122 back until the lug 127 is again engaged and retained by the detent 126. During the return movement of the rock arms the pin 159 passes freely under the lug 158, the slot 155 permitting the lug to rise for this purpose.

The hopper is made long enough for the longest blanks which may be operated upon, and therefore, when shorter blanks are operated on it is necessary that before they are transferred to the work support they be moved longitudinally so as to bring their heel ends in proper position, which is gaged by the left-hand end of the hopper, as shown in Fig. 9. To perform this operation automatically, the machine is provided with an end pusher 160, shown in Figs. 9 and 1, the pusher being shown in dotted lines. This bar is of a thickness somewhat less than that of the finished blank, and is arranged to move at the bottom of the hopper so as to engage the toe end of the lowermost blank therein and move the blank to the left until it engages the left-hand of the hopper, the movement of the pusher being then arrested. The pusher is secured to an upturned shank 162 (see Fig. 1) which is fixed to a slide 163 sliding in guides on the back of the hopper. The slide 163 carries a pin 164 (Fig. 3) which is engaged by the forked lower end of a bell-crank lever 165 pivoted at 166 to the frame of the hopper. The other arm of the bell-crank lever is pivotally connected with a link 167 passing through a stud 168 pivoted on the forward end of an arm 169 fixed to the rock shaft 135. A nut on the upper end of the link 167 engages a compression spring 170 which rests at its lower end upon the stud 168 and maintains a pin 171 in the link 169 normally in engagement with the bottom of the stud 168. When the rock arms move in to transfer a blank the arm 169 swings down and causes the link 167 and lever 165 to move the slide 163 and the pusher to the right-hand end of the hopper so that the lowermost blank can fall freely to the bottom of the hopper, and the end pusher is then in position to engage the end of the blank. During the return movement of the rock arms the end pusher is moved to the left, and moves the blank until the latter engages the end of the hopper. Thereafter the end pusher moves no farther, the spring 170 permitting the link 167 to be arrested, while the arm 169 continues to rise and move the stud 168 out of engagement with the pin 171.

A removable spacer 172 (Fig. 9) is placed in the left-hand end of the hopper when blanks of moderate length are operated on, being removed when it is necessary to increase the distance of the heel from the point at which the operation is begun on

the blank, as in men's work or other long blanks. A similar spacer 173 occupies the right-hand end of the hopper, except a slight space at the bottom which affords a recess for the end pusher when in its right-hand position.

The general operation of the machine may be best described in connection with Figs. 9 to 15 inclusive, in which the sole blank is shown in several of the positions assumed by it in the course of the operations thereon under the influence of the guiding and feeding devices. Fig. 9 shows the position of the blank at the commencement of the operation thereon. When the blank has been transferred to this position the work support rises and the operation upon the blank commences. Since the table 96 rises with the work support the edge stop 151, during the operation upon the blank, does not project above the table 151, and thus there is no danger of the blank accidentally coming into contact with and being arrested by the edge stop as the blank is swung. The first engagement of the blank with the feeler 33 causes the latter to produce a short movement of the lower cams, the function of which movement is to move the trip arm into the proper position for its next succeeding operation, which occurs after the operation upon the shank has been completed and the blank has reached the position of the full lines in Fig. 10. When this position is reached, and the feeler has swung inward to its position in Fig. 10, the cams are again actuated and the guide 31 swings forward so that the guide and the blank assume the positions shown in dotted lines, Fig. 10, the blank being thereby properly swung at the sharp angle between the shank and the forepart. Simultaneously the edge gage is moved forward slightly, so that the margin at the forepart of the blank may be somewhat narrower than that at the shank. After the blank has been swung to the new position the continued movement of the cams causes the guide to be released, so that it may be freely swung somewhat backward again by the blank as the operation proceeds upon the comparatively straight portion of the forepart. During the operation upon the forepart the feed wheel, work support and edge gage operate to maintain the blank in proper engagement with the knives until the sharply-curved extremity of the toe is reached, as shown in Fig. 11 by full lines. At this point the feeler swings to its foremost position and again throws the cams into operation, and the guide is quickly swung to the position of the dotted lines, Fig. 11, thereby swinging the blank to the position shown in dotted lines and designated by the numeral 5. The guide then remains in this position while the operation upon the toe continues, and the guide roll serves as a fulcrum about which the blank is swung by the operation of the feeding means until the blank assumes position 6, Fig. 11, at which point the final portion of the movement of the cam causes the release of the guide to permit the blank to be freely fed along the outside edge of the forepart. The next movement of the cams occurs when the junction between the forepart and the shank is again reached, as in Fig. 12, at which point the blank is swung by the guide, and the edge gage is retracted to widen the margin. The next movement of the cams occurs in the position of Fig. 13, the principal purpose of this movement being to advance the edge gage again to narrow the margin about the heel. Incidentally, also, the guide is moved slightly forward in order to shorten the movement by which it is advanced in rounding the heel. When the heel is encountered, as in Fig. 14, the guide again advances, operating substantially in the same manner as at the toe, but being released, when the heel has been rounded, by an additional movement of the cams. The final movement of the cams occurs when the operation upon the blank has been completed and it has returned to the position shown in Fig. 15. At this point the work support falls, the clearer frees the blank from the knives, and the ejector discharges it from the machine, and a new blank is transferred from the hopper in the manner above described.

In case the supply of blanks in the hopper runs out during the operation of the machine the mechanism is not disarranged thereby, but the knives and feeding means continue to move while the automatic devices remain in the position occupied by them at the completion of the previous operation. The rock shaft 113, upon which the detent 112 is mounted, is provided with a forwardly-extended arm 174, and upon placing a fresh supply of blanks in the hopper it is necessary only to raise the arm 174 momentarily to cause the automatic operation of the machine to be resumed, the upper clutch and cams being thereby caused to operate to transfer a blank to the work support.

In Fig. 8 the operations of the several parts of the machine are set forth diagrammatically, the amplitudes of the several cam movements being indicated in degrees, while the several positions assumed by the different parts are indicated by numerals and letters, the positions of the sole and guide being designated by numerals applied to Figs. 9 to 15 inclusive, while the positions of the trip are indicated by letters which are applied to the corresponding positions assumed by the feeler in the figures referred to. As shown by the diagram, the operations of the blank-transferring device commence after

the lower cams have turned through about 310°, and the final movement of the lower cams is concluded after the upper cams have turned through about 50°. The cycle of operations of the lower cams begins again after the upper cams have turned through about 210°, the transfer of the blank having at this point brought it into contact with the feeler, and the last 170° of movement of the upper cams occurs after the operation upon the blank just transferred has begun, so that the operation of the knives upon a blank is interrupted during only about 210° of a rotation of the feed wheel.

The machine, as shown in the drawings, is fitted to operate entirely around the periphery of the blank, as is customary in some classes of work, but it will be apparent that by slight modifications in the cams it may be made to discharge the blank at any point, so that the operation may be completed after the shank and forepart have been operated upon, as is usual in making insoles for welted shoes.

It will be apparent that the automatic guiding devices and the automatic device for supplying blanks may be used in connection with any machine which operates upon the marginal portion of a sole or insole blank, including machines for slitting, lip turning or for reinforcing insoles, or performing various analogous operations, and the claims, therefore, except such as are directed to the improvements specific to the channeling and shouldering mechanism, are not limited to a machine for performing any particular operation.

The inclined position of the feed wheel and its comparatively small diameter cause it to have a tendency constantly to swing the blank inward against the edge gage, and this tendency is augmented by the rotation of the work support in the plane of the blank, and by the fact that the center of the work support is slightly offset laterally from the knives and the edge gage, as shown in Fig. 5. For these reasons the blank, during the operation upon the shank and upon the comparatively straight portions of the forepart, requires no guidance other than that of the edge gage, as it has no tendency to swing away therefrom. The arrangement and construction of the feed wheel and work support are, therefore, important features of the present invention, as they conduce to the automatic guidance of the blank.

The present invention is not limited to the details of construction and operation of the illustrated embodiment, but may be embodied in other forms broadly defined in the claims.

Having now described the invention, what is claimed is:

1. An automatic sole machine having, in combination, instrumentalities for acting on a sole blank, automatic mechanism, normally inoperative, for actuating said instrumentalities, a feeler engaging the blank, and mechanism connected with the feeler and with said automatic mechanism and operating to throw the automatic mechanism intermittently into operation upon the attainment of different predetermined positions by the feeler, substantially as described.

2. An automatic sole machine having, in combination, instrumentalities for acting upon a sole blank, automatic mechanism, normally inactive, for actuating said instrumentalities, means for throwing said automatic mechanism intermittently into operation including an element movable into and out of operative position, and a feeler engaging the blank and connected with the said element, the feeler operating, as the blank is fed, to move said element into operative position to cause said means to throw said automatic mechanism into operation, substantially as described.

3. An automatic sole machine having, in combination, instrumentalities for acting on a sole blank, automatic mechanism, normally inoperative, for actuating said instrumentalities, means for throwing said mechanism intermittently into operation including a constantly operating power actuated member, a coöperating member movable into and out of operative position to engage the constantly operating member, and a feeler engaging the blank and connected with said coöperating member so as to move the latter, substantially as described.

4. An automatic sole machine having, in combination, instrumentalities for acting upon a sole blank, automatic mechanism, normally inoperative, for actuating said instrumentalities, means for throwing said mechanism intermittently into operation, including a constantly operating member, a coöperating member movable into and out of operative position to engage the constantly operating member, a feeler engaging the blank and connected with said coöperating member so as to move the same, and means for changing, upon the operation of the automatic mechanism, the position of the constantly-operating member to cause it to register with the coöperating member in different positions of the latter, substantially as described.

5. An automatic sole machine having, in combination, means for supporting, feeding and channeling a sole blank before attachment to a shoe, an edge gage, and mechanism acting automatically, during the operation on the blank, to change the relative positions of the edge gage and the channeling means to vary the distance of the channel from the edge of the blank, substantially as described.

6. An automatic sole machine having, in

combination, means for feeding and operating on a sole blank, an edge gage, and mechanism acting automatically, during the operation on the blank, to advance the edge gage when the forepart of the blank is reached and to permit it to retreat when the shank is reached, substantially as described.

7. An automatic sole machine having, in combination, instrumentalities including means for feeding and operating on a sole blank, an edge gage, a feeler engaging the blank, and automatic mechanism controlled by the feeler and acting to change the position of the edge gage during the operation on the blank, substantially as described.

8. An automatic sole machine having, in combination, instrumentalities including means for feeding and operating on a sole blank, an edge gage, a feeler engaging the edge of the blank in advance of the operating means, and automatic mechanism controlled by the feeler and acting to change the position of the edge gage during the operation on the blank, substantially as described.

9. An automatic sole machine having, in combination, a work support, a channeling tool for operating on the sole blank means for feeding the work over the work support, and mechanism acting automatically, when the operation on the blank is completed, to move the work support to release the work, substantially as described.

10. An automatic sole machine having, in combination, a work support, feeding means acting to press the marginal portion of a sole blank against the work support, a channeling tool for operating on the blank, and mechanism acting automatically, when the operation on the blank is completed, to separate the work support and the feeding means to release the blank and means to thereafter discharge the blank, substantially as described.

11. An automatic sole machine having, in combination, means for engaging, holding and feeding the marginal portion of a sole blank, means for operating thereon, and mechanism acting automatically, when the operation on the blank is completed, to cause the blank-holding means to release the blank and means to thereafter discharge the blank, substantially as described.

12. An automatic sole machine having, in combination, a work support, a feeding device coöperating therewith to feed a sole blank over the work support, and mechanism acting automatically upon the insertion of a sole blank between these parts to move them together to grip the blank, and upon the completion of the operation on the blank to move them apart to release the blank, substantially as described.

13. An automatic sole machine having, in combination, instrumentalities including means for holding, feeding and operating on a sole blank, a feeler engaging the blank, and automatic mechanism controlled by the feeler and acting, when the operation on the blank is completed, to operate the holding means to release the blank and means to thereafter discharge the blank, substantially as described.

14. An automatic sole machine having, in combination, instrumentalities including means for holding, feeding and operating on a sole blank, a feeler engaging the peripheral edge of blank, and automatic mechanism controlled by the feeler and acting when a blank is supplied to the holding means, to actuate said means to engage and hold the blank, substantially as described.

15. An automatic sole machine having, in combination, means for feeding and operating on a sole blank, a work support, a feeler engaging the edge of the blank in advance of the operating means, and automatic mechanism controlled by the feeler for actuating the work support to release and secure the work when a finished sole is removed and a blank inserted, substantially as described.

16. An automatic sole machine having, in combination, instrumentalities engaging the marginal portion of a sole blank and including means for feeding and operating upon such portion of the blank, and mechanism controlled by the blank acting automatically, upon the completion of the operation on one blank, and its attainment of a predetermined position as a result of the feeding operation, to supply a fresh blank, substantially as described.

17. An automatic sole machine having, in combination, instrumentalities engaging progressively the marginal portion of a sole blank and including means for feeding and operating upon such portion of the blank, a hopper for holding a supply of blanks, and mechanism acting automatically, upon the completion of the operation on one blank, and its attainment of a predetermined position as a result of the feeding operation, to transfer a fresh blank from the hopper to the said instrumentalities, substantially as described.

18. An automatic channeling machine having, in combination, means for engaging progressively and feeding the marginal portion of a sole blank, means for channeling the blank, and mechanism acting automatically, upon the blank upon the attainment of a predetermined position by the blank, to supply a fresh blank, substantially as described.

19. An automatic sole machine having, in combination, instrumentalities for feeding,

guiding and operating upon a sole blank, automatic blank-supplying mechanism, and a feeler engaging the blank so as to be controlled thereby in its movements as the blank is fed, the feeler being connected with the blank-supplying mechanism so as to throw the same into operation when the feeler reaches a certain position as the result of the progress of the blank through the machine, substantially as described.

20. An automatic sole machine having, in combination, feeding, guiding and operating means, blank-supplying means, a feeler engaging the edge of the sole blank in advance of the operating means, and automatic mechanism, controlled by the feeler for actuating the blank-supplying means when the operation on a blank is completed, substantially as described.

21. An automatic sole machine having, in combination, instrumentalities engaging the margin of a sole blank and including means for feeding and operating upon such portion of the blank, an ejector for ejecting the blank, a blank-supplying device for supplying a fresh blank, and mechanism controlled by the blank operating automatically, upon completion of the operation on a blank, and its attainment of a predetermined position as a result of the feeding operation, to actuate the ejector and the blank-supplying device, substantially as described.

22. An automatic sole machine having, in combination, means for operating on a sole blank, a feeler engaging the blank, and an ejector operating automatically, under the control of the feeler, to eject the work when the operation thereon is completed, substantially as described.

23. An automatic sole machine having, in combination, insrumentalities including means for feeding and operating upon the marginal portion of a sole blank, a work support engaging the blank opposite to the feeding and operating means, a blank-supplying device for supplying fresh blanks to the feeding and operating means, and mechanism controlled by the blank operating automatically, upon the completion of the operation on a blank, and its attainment of a predetermined position as a result of the feeding operation, to actuate the work support to release the blank, and to actuate the blank-supplying device to supply a fresh blank, substantially as described.

24. An automatic sole machine having, in combination, instrumentalities for engaging and operating upon a sole blank, means for supporting a fresh blank, a blank-supplying device acting automatically, upon the completion of the operation on a blank to move the fresh blank into position to engage the operating instrumentalities, and means acting automatically, previous to the operation of the blank-supplying device, to engage the blank yieldingly and move it to a predetermined position against a stop so that it will be supplied in proper position to the operating instrumentalties, substantially as described.

25. An automatic sole machine having, in combination, instrumentalities for engaging and operating upon a sole blank, a hopper for holding a supply of blanks, a pusher moving in the bottom of the hopper and acting automatically to engage the blanks therein and move them endwise into a definite position in the hopper, and a blank-supplying device acting automatically, upon the completion of the operation on a blank, to transfer a fresh blank from the hopper to the operating instrumentalities, substantially as described.

26. An automatic sole machine having, in combination, instrumentalities including a knife and a clearer arranged to engage one side of a sole blank, and mechanism for moving the clearer to push the blank away from engagement with the knife when the operation on the blank is completed, substantially as described.

27. An automatic sole machine having, in combination, instrumentalities including a knife and a clearer arranged to engage one side of a sole blank, a work support engaging the opposite side, and connected mechanism acting, when the operation on the blank is completed, to move the work support away from the knife and cause the clearer to push the blank away from the knife, substantially as described.

28. An automatic sole machine having, in combination, instrumentalities including a channeling knife operating on the marginal portion of a sole blank, means for engaging and feeding the marginal portion of the blank, and a clearer and an ejector acting automatically, when the operation on the blank is completed, to push the blank out of engagement with the knife and eject it from the machine, substantially as described.

29. An automatic sole machine having, in combination, instrumentalities including a knife and a clearer arranged to engage one side of a sole blank, a work support engaging the opposite side of the blank, an ejector arranged to engage the edge of the blank, and mechanism acting automatically, when the operation on the blank is completed, to actuate said parts to release, free, and eject the blank, substantially as described.

30. An automatic sole machine having, in combination, instrumentalities including means for operating on the marginal portion of a sole blank and for swinging the blank in the plane of its surface, a hopper located at a distance from the operating

means less than the length of a sole blank and removed from the plane of the blank being operated on sufficiently to permit the blank to swing clear of the hopper, and automatic mechanism for transferring a blank from the hopper to the operating means, substantially as described.

31. An automatic sole machine having, in combination, instrumentalities including means for operating on the marginal portion of a sole blank and for swinging the blank in the plane of its surface, a hopper located adjacent to the operating means, the bottom of the hopper being near to but sufficiently above the plane in which the blank swings to permit the blank to swing under it, and automatic mechanism for transferring a blank edgewise from the bottom of the hopper to the operating means, substantially as described.

32. An automatic sole machine having, in combination, instrumentalities including means for operating on a sole blank and for swinging the blank in the plane of its surface, a hopper located adjacent to the operating means and having an inclined bottom near to but above the plane in which the blank is swung, and automatic mechanism for transferring a blank edgewise from the bottom of the hopper to the operating means, substantially as described.

33. An automatic sole machine having, in combination, instrumentalities including means for operating on a sole blank, a hopper having a bottom formed of bars supported only at their rear ends and arranged with intervening slots, and a transferring device comprising a bar moving beneath the bottom of the hopper and having blank-engaging fingers extending up between the bars forming the bottom of the hopper so as to engage the edge of a blank in the hopper and transfer the blank to the operating means, substantially as described.

34. An automatic sole machine having, in combination, instrumentalities including means for operating on a sole blank, means for transferring a fresh blank to said operating means, mechanism for actuating the blank-introducing means comprising a cam, constantly rotating shaft, a clutch, normally inoperative for connecting the cam and the shaft, and mechanism acting automatically, when the operation on a blank is completed, to throw the clutch into operation to actuate the blank transferring means, substantially as described.

35. An automatic sole machine having, in combination, instrumentalities including means for operating on the marginal portion of a sole blank, a guide for controlling the swinging of the blank, a cam for actuating the guide, a constantly rotating shaft, a clutch normally tending to operate for connecting the cam and the shaft, a throw-out device for the cam provided with a series of stops for operating the throw-out device and stopping the cam after each of a series of partial rotations, a detent engaging successively the stops to operate the throwout, and mechanism acting automatically to release the detent as certain points on the blank are reached in the course of the operation thereon, substantially as described.

36. An automatic sole machine having, in combination, instrumentalities including means for operating on the marginal portion of a sole blank, a guide for controlling the swinging of the blank, a cam for actuating the guide, means for moving the cam intermittently through a partial rotation as certain points are reached in the operation on the blank, work-changing mechanism, a cam for actuating the work-changing mechanism, a constantly-rotating shaft, a clutch for connecting said cam and shaft, and means connected with the guide-actuating cam for throwing the clutch into operation to actuate the work-changing mechanism when the guide cam has turned through a certain portion of a revolution, substantially as described.

37. A sole machine having, in combination, instrumentalities including two knives for operating on the marginal portion of a sole blank, independent supports for the knives, means for feeding the blank, and mechanism acting to vibrate the two knives and their supports in opposite directions in the line of feed, substantially as described.

38. An automatic sole machine having, in combination, a flat rotary work support, an inclined rotary feed wheel, means for rotating the work support and feed wheel, means for operating on the marginal portion of a sole blank on the work support, and means engaging the edge of the blank and operating, in conjunction with the work support and the feed wheel, to guide the blank automatically during the operation thereon, substantially as described.

39. An automatic sole machine having, in combination, a flat rotary work support, an inclined rotary feed wheel, an edge gage, means for rotating the work support and feed wheel, a channeling knife, and means engaging the edge of the blank and operating, in conjunction with the work support, feed wheel, and edge gage, to guide the work during the operation thereon, substantially as described.

40. An automatic sole machine, having, in combination, means for supporting, feeding and operating on a sole blank before attachment to a shoe, an edge gage and mechanism thrown into operation automatically during the operation on the blank to change the

position of the edge gage, substantially as described.

41. An automatic sole machine, having, in combination, a tool for operating on the marginal portion of a sole blank, a work support arranged to support the blank as it is fed over the work support to present successive portions of its margin to the tool, and mechanism acting automatically, when the operation on the blank is completed, to move the work support to release the work, substantially as described.

42. An automatic sole machine, having, in combination, a work support, a tool for operating on the marginal portion of a blank, feeding means acting to press the sole blank against the work support and feed the sole over the work support to present successive portions of its margin to the tool and mechanism acting automatically when the operation on the blank is completed to separate the work support and the feeding means while the blank is still between them, substantially as described.

43. An automatic sole machine, having, in combination, means for engaging and holding the marginal portion of a sole blank, means for operating thereon while the sole is engaged and held and mechanism controlled by the blank acting automatically when the operation on the blank is completed to cause the blank holding means to release the blank and means for thereafter discharging the blank, substantially as described.

44. An automatic sole machine, having, in combination, instrumentalities engaging progressively the marginal portion of a sole blank and including means for feeding the blank and for operating upon the blank as successive portions of its margin are presented thereto, and mechanism acting automatically upon the completion of the operation on one blank to supply a fresh blank, substantially as described.

45. An automatic sole machine, having, in combination, instrumentalities engaging progressively the marginal portion of a sole blank and including means for feeding the blank and for operating upon the blank as successive portions of its margin are presented thereto, a hopper for holding and supplying the blanks and mechanism acting automatically upon the completion of the operation on one blank to transfer a fresh blank from the hopper to the instrumentalities, substantially as described.

46. An automatic channeling machine, having, in combination, means for engaging progressively and feeding the marginal portion of a sole blank, means for channeling the blank and mechanism acting automatically upon the completion of the operation on one blank to supply a fresh blank, substantially as described.

47. An automatic sole machine, having, in combination, instrumentalities engaging progressively the margin of a sole blank and including means for feeding the blank and for operating upon the blank as successive portions of its margin are presented thereto, an ejector for ejecting the blank, a blank supplying device for supplying a fresh blank and mechanism acting automatically upon the completion of an operation on one blank to actuate the ejector and the blank supplying device, substantially as described.

48. An automatic sole machine, having, in combination, instrumentalities including means for feeding and operating upon the marginal portion of a sole blank, a work support engaging the blank opposite to the feeding and operating means and over which the blank is fed, a blank supplying device for supplying fresh blanks to the feeding and operating means and mechanism operating automatically upon the completion of the operation on a blank to actuate the work to release the blank and to actuate the blank supplying device to supply a fresh blank, substantially as described.

49. An automatic sole machine, having, in combination, instrumentalities for engaging progressively and feeding the marginal portion of a sole blank, and for operating upon successive portions of the margin of the blank, means for supporting a fresh blank, a blank supplying device acting automatically upon the completion of the operation on a blank to move the fresh blank into position to engage the operating instrumentalities and means acting automatically previous to the operation of the blank supplying device to engage the blank and move it to a predetermined position so that it will be supplied in proper position to the operating instrumentalities, substantially as described.

50. An automatic sole machine, having, in combination, instrumentalities including a knife operating on the marginal portion of a sole blank, and means for transferring the point of operation of the knife around the blank, and a clearer and an ejector acting automatically, when the operation on the blank is completed to push the blank out of engagement with the knife and eject it from the machine, substantially as described.

51. An automatic sole machine, having, in combination, a flat rotary work support, an inclined rotary feed wheel, means for rotating the work support and feed wheel, means for operating on the marginal portion of a sole blank on the work support, and means for supplying a fresh blank when the operation on one blank is completed, substantially as described.

52. An automatic sole machine, having,

in combination, a flat rotary work support, an inclined rotary feed wheel, an edge gage, means for rotating the work support and feed wheel, a channeling knife, and means for supplying a fresh blank when the operation on one blank is completed, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

FARNUM F. DORSEY.

Witnesses:
ALFRED H. HILDRETH,
FRED O. FISH.